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ABSTRACT

A comparison of educational inputs and outputs in 1975 and 1985 indicates that the current system of financing, organizing, and regulating America's public schools has failed. The following inputs are examined: (1) school buildings; (2) teachers; (3) administrators; (4) support personnel; (5) supplies; and (6) students. The following outputs are examined: (1) school completion and advancement rates; (2) composite scores on standardized college admission tests; and (3) post-school employment and earnings. The most important changes in school inputs over the decade were the divergent trends in real expenditures and enrollment between the public and private schools. Real expenditures by the public schools increased substantially, despite a substantial decline in enrollment. Real expenditures by the private schools decreased slightly, despite a substantial increase in enrollment. Measures of school outputs remained disturbingly consistent over the decade. The level of educational output per student did not change much, despite the substantial increase in real expenditures per student. Furthermore, international comparisons of performance on mathematics and science tests indicate that the American economy will not be able to maintain its leadership in industrial technology unless even the best American students' performance can be improved. Constant concern about educational reform since 1985 has not resulted in a change in outputs. The lack of improvement must be attributed to changes in the school environment and not to demographic and social conditions. Statistical data are included on five tables. A list of 14 references is appended. (FMW)

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The Performance of America's Primary and Secondary Schools

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Introduction

America's public schools are not serving us well. Over the whole period since World War II, real (inflation-adjusted) spending per student increased about 40 percent a decade, doubling each 20 years. For much of this period, however, average test scores declined substantially. Although test scores have increased somewhat in the 1980s, American students' scores on mathematics and science tests are among the lowest of all of the industrial countries. We are spending much more for schooling, but our students are receiving less education. Our public schools must bear a substantial responsibility for this condition--but not the full responsibility, because a variety of demographic and social conditions have also affected these results. In an increasingly competitive world, the performance of America's schools must improve. Our economic well-being, our national security, and the nature of our national community are at stake.

School Inputs and Educational Outputs

My remarks today compare two "snapshots" of America's primary and secondary schools--one in 1975 and one in 1985, years that bracket the end of the substantial decline in student test scores. [1] Each snapshot summarizes the major inputs to our schools and several measurable dimensions of the outputs of our schools. All of the data presented in the following tables

are from one source, the Statistical Abstract of the United States, an annual publication of the federal government that is available in any public library. [2] Any concerned parent would have easy access to these same data. Some of my remarks, however, will also draw from more specialized reports and studies. A comparison of these snapshots provides a basis for identifying the major changes in the inputs and outputs of our schools.

These conditions reflect the average conditions in our schools. The performance of some schools, of course, is much better, but that implies that the performance of other schools is much worse. These comparisons, however, are not a sufficient basis for identifying the effect of specific school inputs on educational outputs, because a variety of changes in the composition of students and the characteristics of our families and communities also affect educational performance. For a more thorough understanding of the effects of school inputs and other conditions on educational performance, we must draw on other studies, but we must also be prepared to recognize that no one understands this complex process very well.

School Inputs

The necessary inputs to a school are a building, teachers, administrators and support personnel, supplies, and students. Although these are the necessary and most measurable inputs, they are not the most important inputs that affect educational

performance. Indeed, the most careful and comprehensive survey of the conditions that affect educational performance concludes that (within the range of variation of the measurable school inputs, both over time and across schools) "differences in [school] quality do not seem to reflect variations in expenditures, class sizes, or other commonly measured attributes of schools and teachers." [3] The most important characteristics that distinguish good schools from poor schools, according to a major forthcoming study by John Chubb and Terry Moe, are subtle differences in the school environment that are not related to variations in the major measurable inputs. [4] Nevertheless, it is worthwhile to start this discussion by summarizing the level and changes in the major measurable school inputs. The major focus in on the public schools, because nearly 90 percent of primary and secondary students are now enrolled in these schools, but it is also important to recognize the most important differences in the inputs to public and private schools.

Table 1 summarizes the major inputs to public and private schools in 1975 and 1985 and the percent changes in these inputs. There data reflect the total inputs (other than students) into the primary and secondary schools, not the inputs per student, but by themselves they reveal a number of interesting patterns:

--Total real expenditures by the public schools increased 16 percent over this decade. Over the past several decades, state government financing has grown most rapidly and states have now become the major source of public school finance

Table 1 Expenditures, Employment, and Prices

	1975	1985	Percent Change
Expenditures (billions of 1985 dollars)			
Public			
Total	117.7	136.5	16.0
Federal	10.9	8.9	-18.1
State	49.3	66.3	34.6
Local and Private	57.6	61.3	6.5
Private			
Total	13.0	12.4	-4.9
Employment (000)			
Public			
Total	3969	4416	11.3
Teachers	2055	2210	7.5
Other	1914	2206	15.3
Private			
Teachers	255	343	34.5
Relative Prices (1975 = 100)			
Public			
Total	100	121.5	21.5
Professional Salaries	100	112.1	12.1
Other Salaries	100	110.5	10.5
Fringe Benefits	100	213.7	113.7
Supplies and Services	100	117.1	17.1

and regulation.

--Total employment in the public schools increased about 11 percent over this decade. The number of nonteaching employees increased most rapidly and is now nearly equal to the number of classroom teachers. The number of teachers in the private schools increased almost 35 percent. (Aggregate data on nonteaching employees in the private schools are not available).

--The relative price of inputs into the public schools increased 21.5 percent over this decade. Real salaries increased by 10-12 percent, but real fringe benefits more than doubled. (Similar data for the private schools are not available.)

Total enrollment in the public and private schools, however, changed substantially in different directions. For this reason, the enrollment and input ratios presented in Table 2 are more interesting. Two contrasting developments in the public and private schools over this decade are most dramatic:

--Total enrollment in the public schools declined nearly 14 percent, but (estimated) enrollment in the private schools increased by 12 percent. Enrollment in the Catholic schools (not shown) declined by nearly 600,000 over this decade, but total enrollment in the non-Catholic private schools increased by about 1.2 million. The reasons for this substantial reallocation of students, during a decade in which the total student population declined about 6 million,

Table 2 Enrollment and Input Ratios

	1975	1985	Percent Change
Enrollment (000)			
Public	45,909	39,513	-13.9
Private	5,000	5,600	12.0
Expenditures per Student (1985 dollars)			
Public			
Total	2,564	3,455	34.8
Current	2,104	3,211	52.6
Private			
Total	2,607	2,214	-15.1
Students per Unit			
Public			
per District	2,715	2,489	-8.3
per School	522	470	-9.8
Catholic			
per School	342	305	-11.7
Students per Employee			
Public			
Total	11.6	8.9	-22.6
per Teacher	22.3	17.9	-20.0
per Other Employee	24.0	17.9	-25.3
Private			
per Teacher	19.6	16.3	-16.7

reflects a mix of motives that are not yet well understood.

--Total real expenditures per student in the public schools increased about 35 percent over this decade. The decline in enrollment, however, permitted a reduction in real spending for capital, interest, and peripheral programs; excluding these categories of spending, real current expenditures per student enrolled in the regular public school programs increased over 50 percent!

Total real expenditures per student in the private schools, however, declined about 15 percent, despite several conditions that might have been expected to increase real spending. The increase in enrollment must have increased capital spending, the number of private-school teachers increased more rapidly than enrollment, and the share of lay teachers in the Catholic schools increased substantially. The conditions that contributed to the decline in real spending per student in the private schools are not yet understood.

In 1975, real spending per student in the public schools was about the same as in the private schools. In 1985, real spending per student in the public schools was about 50 percent higher than in the private schools. Since both the expenditures and enrollment data for private schools are estimates, some part of this difference may be sampling error. The magnitude and potential implications of this difference, however, are too large to dismiss. This

substantial difference should be a major focus of additional research.

Two other trends during this decade were common to both public and private schools. The average number of students per school district and the number of students per school in both public and Catholic schools declined by about the same percent, despite the continued consolidation of school districts and the closing of many schools. The average public school has continued to be about 50 percent larger than the average Catholic school. (Similar aggregate data on non-Catholic private schools are not available.) The average number of students per teacher (a rough proxy for average class size if teaching hours per teacher are constant) also declined by about the same percent in both public and private schools.

The average class size in public schools continued to be about 10 percent higher than in private schools. The number of students per nonteaching employee in the public schools also declined substantially, reflecting the increased number of administrators, counselors, security personnel, and school bus drivers. Aggregate data on the number of nonteaching employees in the private schools are not available, but selective evidence indicates that the relative number is much smaller than in the public schools; this may be one of the major reasons for the lower average cost per student in the private schools, but, as mentioned above, more research on this issue is important.

In summary, the most important changes in school inputs

between 1975 and 1985 were the divergent trends in real expenditures and enrollment between the public and private schools. Real expenditures by the public schools increased substantially, despite a substantial decline in enrollment. Real expenditures by the private schools declined slightly, despite a substantial increase in enrollment. The reasons for the substantial divergence in these trends, however, are not yet fully understood.

Educational Outputs

A school produces many types of outputs, not all of which can be easily measured. In addition, the value of the many types of outputs to voters, taxpayers, employers, parents, and students differs substantially. For these reasons, no one measurable condition is a sufficient index of the output of the primary and secondary schools or, more important, of the value of these outputs. With full recognition of this problem, this section focuses on three reported measures of school output--school completion and advancement rates, composite scores on the major college tests, and post-school employment and earnings. These data do not permit a distinction between the outputs of the public and private schools, but they dominantly reflect the outputs of the public schools. [5]

Table 3 summarizes the percent of the student-age population completing high school and the percent of high school graduates enrolled in college and completing one or more years of college.

Table 3 School Completion and Advancement Rates

	1975	1985	Percent Change
igh School Completion Rates			
Percent of Pop. Age 17	73.6	73.3	-0.4
Percent of Pop. Age 25-29	79.2	86.1	8.8
ollege Experience of H.S. Graduates			
Percent Enrolled	33.1	34.1	3.6
Percent Completing 1 or More Yrs	52.1	54.3	3.4

These data reveal the following trends:

--The percent of teenagers completing high school by the normal age has been roughly constant for two decades. The 1985 rate, for example, is somewhat lower than the 1970 rate and slightly higher than the 1965 rate (the latter two rates are not shown). The share of the population completing high school by age 29, however, increased by about 9 percent from 1975 to 1985, reflecting in part the increased attention to adult education.

--The percent of high school graduates enrolled in college or completing one or more years of college each increased by 3-4 percent. This record, however, should be tempered by other data (not shown): 25 percent of college freshman in 1984 were enrolled in one or more remedial courses, and 63 percent of colleges reported that enrollment in remedial courses increased by 10 percent or more between 1978 and 1984. [6]

The combination of these data suggests that the high schools have maintained a roughly constant graduation rate only by tolerating an erosion in the quality of schooling in the basic subjects.

Table 4 summarizes the composite scores and the percent of high school graduates tested by the two major college testing programs. The most striking finding reported this table is that there was no net change in the composite scores on either of these major tests between 1975 and 1985, despite the large increase in real expenditures per student in the public schools.

Table 4 Performance on the College Entrance Tests

	1975	1985	Percent Change
Scholastic Aptitude Test (SAT)			
Composite Score	806	806	0.0
Percent Tested	31.8	36.4	14.5
American College Testing Program (ACT)			
Composite Score	18.6	18.6	0.0
Percent Tested	22.8	27.5	20.6

Maybe we should be thankful for small favors; during the prior decade, the composite test scores declined sharply, despite a similar increase in real expenditures per student. The recent stability of the composite scores on both of these tests is especially interesting, because these two tests are quite different. The SAT is primarily a test of problem-solving skills, closer to an IQ test. The ACT is primarily a test of the substantive understanding of four basic subjects. The quality of our primary and secondary schools does not seem to be improving in either dimension, despite the substantial increase in real expenditures per student and the accumulation of conventional "reform" efforts.

The interpretation of these results, however, should be tempered by recognizing two contrary trends. On the one hand, the number of students tested has increased substantially relative to the number of high school graduates (although some of this increase may be spurious if more students are taking these tests more than once). To the extent that a broader student population is being tested, the recent composite scores somewhat understate student performance. On the other hand, many schools increasingly "teach to the tests," and many students take supplementary test preparation courses. For this reason, the test scores of college-bound students may overstate the performance of the average student. This issue is not easy to resolve. A more accurate indicator may be the scores on the tests taken by all high school seniors in several states. In

both California and Iowa, for example, the average test scores of high school seniors have also been roughly constant over this same period. [7] These tests suggest that the composite scores on the SAT and ACT tests may not be significantly biased. On balance, these data indicate that average student performance on objective tests of both problem-solving skills and substantive understanding is no longer declining; the current problem is that student performance is not increasing, or not very much, despite the substantial increase in real expenditures per student.

Table 5 summarizes the employment and earnings record of high school graduates who are not enrolled in college and also of high school dropouts. For context, it is important to recognize what happened to the general U.S. economy between 1975 and 1985; 1975 was the trough year of the severe 1974-75 recession, and 1985 was the third year of recovery from the severe 1981-82 recession. Total employment as a share of the total adult civilian population increased 7.3 percent between these years. The population of ages 16-21 not enrolled in college declined from 6.9 percent to 5.1 percent of the total adult civilian population, a condition that should have tightened the market for low-skilled labor. The real foreign-exchange value of the dollar increased by about 40 percent, increasing the competitiveness of foreign products and labor. And the average real hourly wage rate in the total nonagricultural economy increased 4.5 percent between these years. These changes in the general economy provide context for the following trends in the post-high school

Table 5 Employment and Earnings after High School

	1975	1985	Percent Change
Employment Rate (percent)			
Graduates	70.5	73.1	3.8
Dropouts	43.7	46.4	6.3
Annual Earnings (1985 dollars)			
Graduates	13,048	12,680	-2.8
Dropouts	12,285	11,407	-7.2

employment and earnings of those not enrolled in college:

--The employment rates (through age 21) for high school graduates not enrolled in college and for high school dropouts each increased, but by a lower percent than the 7.3 percent for the total adult population.

--The real annual earnings for full-time work (for ages 18-24) declined for both high school graduates and dropouts, compared to an increase of 4.5 percent for the total adult population and 8 percent for new college graduates.

Since employment and earnings are a function of both supply and demand conditions, these data, by themselves, are not sufficient to identify whether the job-related skills of young workers declined or whether the demand for these skills declined; the probable answer is that these data reflect a combination of these two effects. The substantial increase in the proportion of college freshman enrolled in remedial courses suggests that the substantive skills of the average high school graduate declined. This period, however, was also unusual in one other respect: for the first time since World War II, the earnings of new college graduates increased relative to the earnings of young workers with only high school training. One study suggests that the substantial change in foreign trade conditions in the early 1980s increased the demand for high-skilled labor and increased the effective supply of low-skilled labor.[8] (The tightening of the teenage labor market associated with the sharp decline in the foreign-exchange value of the

dollar since 1985 is also consistent with this interpretation.) More research is necessary to sort out these two effects. In summary, it appears probable, but not certain, that the average job-related skills of young workers without college training declined over this period. It is clear that the value of these skills declined. In either case, our schools, despite a substantial increase in real expenditures per student, are not adequately preparing young workers for the contemporary job market.

The several types of measures of educational output reviewed above present a disturbingly consistent record. The percent of students completing high school by the normal age did not change. Although the percent of high school graduates entering college increased slightly, the percent then required to take remedial courses increased substantially. The composite scores on the two major college tests did not change. And the real earnings of new high school graduates not enrolled in college declined. On net, based on these measures, the level of educational output per student did not change much between 1975 and 1985, despite the substantial increase on real expenditures per student. It is only small consolation to recognize that educational output declined in the prior decade. These types of measures, of course, do not exhaust the many dimensions of educational output. One might hope, for example, to know how much our students understand our shared history and culture or our contemporary economic and political systems. The recent tests by the National

Assessment of Educational Progress (NAEP) indicate a dismally low average understanding of these subjects but do not provide a basis for estimating whether performance in these areas has improved or declined. [9]

International Comparisons

The recent international comparisons of performance on mathematics and science tests are even more dismal. On a 1982 test, American 17-year-old students were in the lowest fourth of 15 countries on five of six basic math subjects; even our best students do not score well in comparison, placing last in tests on algebra and calculus. A 1988 test of science skills had similar results. American 14-year-old students placed 14th out of 17 countries, and advanced science students in their senior year placed 9th out of 13 countries in physics, 11th in chemistry, and last in biology [10]. This record must be improved if the American economy is to maintain its leadership in industrial technology.

Developments Since 1985

Much of the data presented in these tables are not yet available for the years since 1985. The available data, however, are not encouraging. Real expenditures per student have continued to increase at about the same rate. Following the 1983 report on A Nation at Risk [11] the pace of school reform

efforts has increased. And the composite score on the Scholastic Aptitude Test was constant from 1985 through 1987--and declined slightly in 1988. The increasing concern about the quality of our schools by parents, employers, and politicians has not yet had much effect on school performance.

Demographic and Social Conditions

Our schools, of course, operate in an environment of changing demographic and social conditions that also affect educational performance. A careful recent study by the Congressional Budget Office (CBO), however, concludes that, "It appears that the contributions of these factors were generally less substantial than many observers have thought, ranging from very small to modest." [12]

The most important demographic change appears to be the increasing proportion of minority students and the changes in average family size, but the CBO study attributes only one-fifth to one-fourth of the decline in test scores to the sum of these conditions. Among the social conditions that appear to have had no significant effect are changes in single-parent households, maternal employment, and television viewing. There is more controversy, however, about the effects of drug use. The patterns of current drug use by people aged 12-17, however, are mixed. From 1974 to 1985, the percent of this group that were current users of marijuana was about constant; the percent using inhalants, cocaine, and other stimulants increased slightly; and

the percent using alcohol and tobacco declined. [13] The supply of illegal drugs may have significantly disrupted the school environment, but the mixed patterns of current drug use probably had little net effect on educational performance. On net, most of the changes in the performance of America's schools appear to be due to changes in the school environment, not to the other major changes in the American population and social conditions.

Conclusion

The time for excuses is over. All of the conventional proposals for school reform have been implemented--and have failed. Real expenditures per student in our public schools have increased rapidly for 40 years, average class sizes have declined, average real teacher salaries have increased, the centralization of public school finance by state governments has substantially reduced the variation of spending per student among school districts, and there has been a gradual consolidation of the smallest school districts and schools. [14] Although average student performance increased somewhat in the 1980s, the average composite score on the SAT is now about the same as in 1974 and is much lower than in 1963. And the absolute level of understanding of basic subjects is dismally low, by both our own standards and international comparisons, even among our best students.

There remains a legitimate controversy about the appropriate directions of future school reform. The beginning of wisdom, however, is to recognize that the current system of financing, organizing, and regulating America's public schools has failed.

Footnotes and References

1. The average composite score on both the Scholastic Aptitude Test and the Iowa Tests of Educational Development (for Grade 12), for example, were lowest in 1979.

2. Bureau of the Census, Statistical Abstract of the United States (Washington, D.C.: U.S. Government Printing Office, 1988 and prior issues). All dollar data for 1975 are adjusted to 1985 dollars by the GNP fixed-weight deflator.

3. Eric A. Hanushek, "The Economics of Schooling: Production and Efficiency in the Public Schools," The Journal of Economic Literature, Vol. XXIV, No. 3, September 1986.

4. John E. Chubb and Terry Moe, What Price Democracy: Politics, Markets, and America's Schools (Washington, D.C.: The Brookings Institution, 1989). The major findings of this study are summarized in the paper by John Chubb presented at this conference.

5. The painstaking empirical studies by James Coleman and his colleagues, however, suggest that educational performance is about one grade lower in public schools than in Catholic schools, even when controlled for student, family, and community characteristics and other conditions that may lead to a selection bias. Moreover, the average public school is less integrated than the average Catholic school, and minority students generally do better in Catholic schools. For an efficient summary of these studies, see James Coleman, "Do Students Learn More in Private Schools than in Public Schools?" Florida Policy Review, Vol. 5, No. 1, Summer 1989.

6. Statistical Abstract, p. 142.

7. Congressional Budget Office, Trends in Educational Achievement, April 1986, pp. 104 and 109.

8. Kevin Murphy and Finis Welch, "Wage Differentials in the 1980s: The Role of International Trade" (unpublished manuscript, 1988).

9. For a summary of these tests, see U.S. Department of Education, American Education: Making It Work, April 1988, pp. 12-14.

10. Ibid., pp. 12, 13.

11. National Commission on Excellence in Education, A Nation At Risk, 1983.

12. Congressional Budget Office, Educational Achievement: Explanations and Implications of Recent Trends, August 1987.

13. Statistical Abstract, p. 112.

14. My own study of the California public school system concludes that student performance is a negative function of the size of the school district, after controlling for expenditures per student and student, family, and community characteristics. This study was also the first to develop a proposal for a school choice plan within the public schools. See William A. Niskanen and Mickey D. Levy, "Cities and Schools: A Case for Community Government in California" (Graduate School of Public Policy, University of California Berkeley, 1974).